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This study investigates the relationship between auditory and visual acuity and the learning of first grade reading and spelling. It was the aim of this study (1) to clarify the relationship between auditory and visual perception; (2) to investigate the ability of subjects to read and spell when, and if, differences exist in the perceptual modalities; and (3) to see if there exists a relationship between perceptual ability and socioeconomic status. The subjects, 342 first grade children from three types of socioeconomic groups, were administered an intelligence test, then auditory and visual tests, and, at the end of the school year, reading and spelling tests. The results showed that (1) there was no substantial relationship between visual and auditory perceptual modalities; (2) the composite use of both modalities as predictors of achievement was more effective than the use of each alone; (3) nonverbal auditory and visual perceptual variables were better predictors than perceptual variables with verbal components; (4) auditory discrimination was more important in middle class children and visual perception was more important in lower class subjects for prediction of first grade achievement; and (5) middle class children were more able on perceptual variables having verbal components than lower class children. (WD)

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Perceptual Mode Dominance: An Approach to Assessment of First Grade Reading and Spelling

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Problem

Many children are unsuccessful in learning the written language skills of reading and spelling at the first-grade level. This study is intended to explore auditory and visual perception as each relates to first grade reading and spelling. The results should help clarify the extent to which each of these relatively independent perceptual modes contributes to the learning of first-grade reading and spelling. This clarification may contribute to the solution of the pedagogical problem of matching instructional methods with children's optimal perceptual modes.

Toward the middle of the last century Charcot proposed that individuals have specialized proclivities for learning in either the auditory, visual or tactile modes (Freud, 1953). If, in fact, children have relative strength or weakness in either modality, and it is a consistent pattern, we should be obliged to assess this consistency (Vernon, 1957).

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[1] The study was initiated, conducted and analyzed, in part, while the author was affiliated with the University of Chicago; the Woodlawn Mental Health Center (Chicago); and the John J. Madden Zone Center (Hines), Illinois Department of Mental Health.

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Assuming that children have predominant perceptual modes at a first-grade level, the feasibility of measuring the dominance seems to lie in the practicality of identification with group screening methods in that the time involved deems it all but impossible to make the determination with individual testing procedures for all children. The impracticality of individual evaluation of perceptual abilities in regard to time, expense and small numbers of children who can benefit from individual evaluation, is all too obvious. Thus, group screening instruments were employed in this study.

A fundamental premise of this study is that inability to acquire reading or spelling skills is the result of deficiency in at least one of the perceptual modes, and that this deficiency is exacerbated when reading instruction is primarily aimed at the perceptual sphere in which the child has a relative weakness. Thus, teaching phonics, in a relatively "pure" form will place a child at a disadvantage if he is delayed in auditory perceptual ability.

The following three aims were established for the study:

1. To clarify the relationship between auditory and visual perception.

2. To determine the minimum amount of variance in reading and spelling at the first-grade level that can be accounted for by differences in auditory and visual perception.

3. To determine whether non-verbal auditory and/or visual perceptual ability is related to socio-economic status, and then evaluate the respective role of auditory and visual perception of first-grade children from varied socio-economic backgrounds in their acquisition of first-grade language skills of reading and spelling.

Review of the literature indicates that both perceptual modalities are separately important, but there is little information regarding the relative importance of each modality at the first grade level, because very few studies have examined both auditory and visual perception. Furthermore, it is conceivable that differences in auditory or visual perception, leading to differences in facility for early academic learning, are related to socio-economic levels.

Many studies of auditory or visual perception, such as those characterized by De Hirsch (1957), Durrell & Murphy (1953), Goins (1953), Koegh (1963), and Wepman (1959) have provided evidence of a positive relationship between a single perceptual modality and reading ability. Some of the investigators successfully predicted achievement on the basis of strength or weakness in a single perceptual mode.

Auditory perception -- Wepman (1959) suggested that children with poor auditory discrimination are likely to be poor readers, and this was corroborated by Deutsch who found that poor readers have more difficulty than good readers with auditory discrimination tasks (1964). Deutsch went on to postulate that a "...minimum level of auditory discrimination is necessary..." for the acquisition of reading and other verbal skills. A report by Goetzinger, Dirks & Bare (1960) indicated the affirmative side of the position by demonstrating that a small sample of good readers showed "superior ability" in auditory discrimination. Durrell (1953) and Thompson (1961) presented results from separate studies indicating a significant relationship between auditory discrimination and reading.

It was hypothesized by Hodges and Rudorf (1964) that auditory perception is the most important modality for acquiring spelling skill. They indicated that the auditory modality gains even more prominence when there is a consistent phoneme-grapheme relationship in the language. Bogda (1964) demonstrated the importance of auditory perception in that a multisensory phonics program resulted in substantial increases in spelling, and that the program was most effective when introduced in first grade. In contrast to this, Hahn (1964) indicated that intensive phonics instruction did not increase spelling ability in the primary grades. Let it also be noted that both Petzold (1963) and Wepman (1959) report a progressive development of auditory perception with age. Petzold indicated the implications for instruction as follows:

> The existence within each grade level of children with differences...of competence...in aural understanding further emphasizes the need for developing teaching procedures and activities which will take account of these differences, and result in more effective teaching on the part of all children (Petzold, 1963, p. 42).

Visual perception -- Vernon was a proponent of the position that visual perception is the most important of the two modalities in the acquisition of academic skills, but felt that more studies should be done with children rather than adults (1957). Ryan, attempting to examine the effects of visual perception at a more critical age, discovered that visual perceptual skill is of greatest predictive value at the kindergarten level, but less important in its correlation with reading attainment as the child passes through the primary grades (1964). As a result of his findings, he was one of the first to suggest

that visual perceptual development of children be assessed at the kindergarten level. In a study with first-grade children, Goins (1958) demonstrated the importance of visual perception in the "learning-to-read stage", and hypothesized that the visual perceptual tests she used would show a significant correlation with later reading success. Veto (1964), in a more recent study, states that keen visual perception allows for a lot of incidental learning which facilitates the acquisition of reading and spelling.

There was a series of studies that used visual perceptual tests which were quite verbal in nature and almost identical to reading. The studies of Gates (1922), Sister Mary of the Visitation (1929), and Sister Mary Phalen (1940) are characteristic and seemed to use tests that appeared to be similar in content to the reading process. All three of the studies represent a similar shortcoming of using language-based perceptual tasks which seem to measure beginning achievement rather than a more "fundamental" kind of perceptual function that non-language perceptual tasks seem to measure.

Although auditory and visual perception have been studied rather extensively, the relationship between these two perceptual modalities has received little consideration. Katz and Deutsch recently reported, in a study of both modalities, that practically all the auditory and visual skills which were studied differentiated good from poor readers (1963). They indicated that retarded readers learned more rapidly via the visual modality presentations than through the aural modality, suggesting that the visual mode is the

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most important for acquisition of a beginning academic skill like reading.

Barrett (1965) maintains that first-grade teachers can observe differences among their pupils in the performance of visual perceptual tasks, which will determine their readiness to read. His findings showed that a combination of visual perceptual tasks account for a sufficient amount of variance in predicting beginning reading achievement to warrant a careful evaluation of these elements early in a child's school career. However, he points out that the visual perceptual factors:

> ...did not provide enough predictive precision to warrant their use alone in predicting first-grade reading achievement for individuals. In fact, ...visual discrimination information must be supplemented ...in other readiness areas, e.g., auditory discrimination ...if accurate decisions about reading readiness are to be made in the classroom (Barrett, 1965, p. 281).

Cross-modal integration -- The review of literature indicated that geometric form reproduction (copying of geometric figures) -- a type of functional integration of visual-motor abilities[2] is related to acquisition of academic achievement. Difficulty integrating one modality with the other is likely to be a principal characteristic of children with reading or spelling difficulties. Studies by De Hirsch (1957), Koppitz (1958), Smith & Keogh (1962), Walters (1961), and Wilson (1938), are representative of the interest shown in visual-motor aspects of early learning. For example, Koppitz found significant correlations between the Bender

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[2] It should be noted that in this context, visual refers to visual perception and not merely to the sensory function.

Gestalt Test, two reading readiness tests, and a reading achievement test. The study by Katz and Deutsch (1963), is one of auditory - visual perceptual patterning which indicates the importance of more than one perceptual modality in relationship to reading. Studies by Potter (1949), Robinson (1960), and Walters (1961) have indicated that geometric form reproduction accounts for as much as 36 per cent of the variance in reading achievement. Russell (1961) attended to the importance of more than one perceptual mode in reading acquisition by indicating that it simultaneously involves sensation, perception, and motor function (e.g., as eye movements).

In one of the earliest studies of visual-motor perception as related to learning in the classroom, Chinnappa emphasized its importance by stating:

> Finally, the most incredible rapidity and excellence with which children between five and six years of age learn to read, write and cipher, and draw in the Montessori Schools in Rome, is due among other things to the fact that nearly all the preliminary exercises leading to these arts are based on the development of form perception (1914, pp. 58-59).

Either poor motor control, or poor visual perception, will affect the quality of geometric form reproduction. As a child approaches school age, his reproductions of geometric figures increasingly become a veridical representation of the original. However, "pure" cases of either visual imperfection or lack of motor control are infrequent. Koppitz provides a convenient rule of thumb to determine the nature of

the problem. If the difficulty is primarily motoric, the child will recognize them as errors (1958). Vereeckan provides evidence indicating that failures in form reproduction are not merely a matter of poor motor control or inability to move a pencil, since he found that the same or similar distortions were made while using sticks as the materials for reconstructing the geometric figures (1961).

Socio-economic differences -- The relationship between perceptual abilities and socio-economic status has not been ascertained. There is no doubt that difficulty in reading occurs with greater frequency among the lower socio-economic children than among other socio-economic groups. However, there is little indication of why this might be true. Weiner and Feldman (1963) claim that poor readers from any socio-economic status can be identified prior to formal training in reading, and that their skill deficiencies (meaning auditory and visual discrimination) underlying low reading achievement can be ascertained. This is consistent with the findings of Katz and M. Deutsch (1963) that lower-class children have difficulty utilizing aurally presented information.

Hypotheses

Our knowledge of visual and auditory capabilities of children and of the relationships between perception and early learning of reading and spelling skills is lacking in several respects. First, there has been no report to date of the degree of independence of

auditory and visual perception. Considering the fact that the auditory and visual perception are separately related to early learning, it seems that the relationship between those modalities must be determined. Second, many studies have focused on auditory and visual perceptual capabilities of children at an age which is too old for appropriate matching of children with instructional method. Third, the relationship between perceptual abilities and socio-economic status has not yet been ascertained. Fourth, previous studies have focused on one of the perceptual modalities to the exclusion of the others without examining the relationship between the modalities and acquisition of academic skills. Fifth, many of the studies that relate visual perception to reading make use of perceptual tests that are "contaminated" with elements of reading. Verbal-based perceptual tests, e.g., the matching of lower case letters, seem to be a measure of beginning achievement rather than a measure of potential for acquisition of academic skills. Thus, a present research need seems to be to determine the capacity for learning academic skills without using language-based tasks to measure this potential. This position assumes that language-based tasks are at a higher level of abstraction than perceptual tasks which appear to be relatively free from language.

The present study was an attempt to assess the interrelationships between perceptual modalities and how the relative strengths of each modality relate to acquisition of reading and spelling at the first-grade level, which is thought to be a critical time.

Given the above problems, the following hypotheses were derived:

1. No substantial relationship will obtain between auditory and visual perception, and there will be no substantial common variance between the two perceptual modes when verbal components are partialled out.

2. Either visual or auditory variables will significantly increase predictive power when added to the other in a regression equation. That is, either visual variables taken singly or auditory variables taken singly will do significantly poorer in prediction than when both are used in a composite predictor.

3. Reading and spelling achievement at the end of first grade are significantly related to a composite prediction containing both non-verbal auditory and visual perception.

4. Perceptual variables which have verbal components will be better predictors of reading and spelling achievement than the non-verbal visual and auditory variables.

5. Middle-class children will be more able than lower-class children on perceptual variables having verbal components, but no difference will be obtained between these groups for the perceptual variables which are free from verbal components.

Method

A sample of 342 subjects comprising 21 first-grade classrooms was selected from three suburban school districts in the metropolitan area of Chicago. Each of the school districts represents a different socio-economic group, as determined by the Suburban Fact Book (1960); one being essentially white middle-class, another lower-class Negro, and the third, lower-class white. The classification of the districts is a composite socio-economic rank based on income, type and value of dwelling, type of occupation, and amount of schooling of residents in the community. The sample of first-grade children was selected on the basis of four

criteria. First, it was felt that a first-grade sample was important to use; second, consideration of different socio-economic groups; third, a similarity of reading programs in the various school districts; and fourth, availability of the sample to be followed over a three-year period as a continuation of the present investigation.

The first step in the procedure of the investigation was the selection of the perceptual and achievement tests (Table I). Two of the visual perceptual tests were used by Goins (1958) in a previous study, and one was recently developed by Beery and Buktenica (1964). The auditory perceptual tests included the Wepman Auditory Discrimination Test (1953), and the Non-Verbal Auditory Discrimination Test which is currently being standardized. The Metropolitan Reading Achievement Test was used, and a spelling test composed of 20 words was compiled for use in the study. All of the tests were group administered.

The subjects were administered the auditory and visual perceptual tests in the middle of the school year, and immediately prior to that were given a group intelligence test. During the last weeks of the school year, they were given the reading achievement and spelling tests as the criterion measures for the study.

TABLE I

Classification and Reliability* of Variables

	Variable	Reliability
I.Q.	1. Science Research Associates, Primary Mental Abilities Test	.93
Visual Perception	2. Picture Squares Test	.86
	3. Reversals Test	.95
	4. Beery-Buktenica Visual-Motor Integration Test	.78
Auditory Perception	5. Wepman Total	.79
	6. Wepman Auditory Discrimination Test	.72
	7. Wepman Validity Scale	.79
	8. Non-Verbal Auditory Discrimination Test	.75
Achievement	9. Reading Total	.96
	10. Word Knowledge	.93
	11. Word Discrimination	.92
	12. Spelling Test	.93

*Based on Kuder Richardson Formula 20

Results

The principal procedure used for data processing was multiple regression analysis, which determined the relative contribution made by each of the independent variables (auditory perception, visual perception, and I.Q.) in predicting the dependent variables (reading

and spelling). Partial correlation was used to determine the relationship between auditory and visual perception with verbal components partialled-out. Canonical correlation was computed in order to determine the relationship when considering the best combination of all auditory perceptual variables and all visual perceptual variables. However, before the data were so treated, reliability of each of the tests and univariate statistics were computed (Table I).

Correlations in the order of .12 to .36 between the perceptual variables gives supportive evidence for the first hypothesis: No substantial relationship will obtain between auditory and visual perception ... Partial correlations were computed in order to determine the residual relationship between auditory and visual perception when the common influence of the verbal components of auditory and visual perceptual variables were removed. The results of this treatment reveals a partial correlation coefficient of .21 between the non-verbal auditory and visual perceptual measures with verbal components partialled-out. The square of this partial correlation gives an estimate of our per cent common variance between the perceptual spheres. Thus, it can be stated that the data confirm the hypothesis: ...there will be no substantial common variance between the two perceptual modes when verbal components are partialled out.

TABLE 2

PER CENT OF VARIANCE EXPLAINED

TOTAL SAMPLE

(N-342)

	Visual-Motor Integration Test			Non-Verbal Auditory Test			Visual-Motor Integration Test & Non-Verbal Auditory Test		
	PVE	R_1	F_1	PVE	R_2	F_2	PVE	R_3	F_3**
Total Reading	.25	.50	112.1	.26	.51	116.5	.37	.61*	99.0
Word Knowledge	.24	.49	105.4	.22	.47	97.7	.34	.58*	86.2
Word Discrimination	.23	.48	99.4	.26	.51	116.8	.35	.59*	92.7
Spelling Test	.20	.45	85.3	.20	.45	84.9	.30	.55*	73.3

*Increase over R_1 and R_2 significant at .01 level

**Values for F_1, F_2, and F_3 are significant at .01 level or above

The second hypothesis is confirmed in that either auditory or visual perceptual variables will significantly increase predictive power when added to the other in a regression equation, as indicated in Table 2. For example, Visual-Motor Integration Test (VMI) and the Non-Verbal Auditory Discrimination Test (NVADT), account separately for 25 per cent and 26 per cent of the variance in reading, and when combined they account for 37 per cent of the variance in reading. Carrying the point further, we find that the two non-verbal perceptual variables (VMI and NVADT), when combined, or the three visual variables combined, in a regression equation. That is, the four auditory perceptual variables combined account for 33 per cent of the variance in reading; and the three visual perceptual variables account for 28 per cent of the variance in reading.

Insert Table 2 about here

When we partial out the effect of either the VMI or the NVADT in a regression equation with reading as the criterion, we find additional suggestion of independence between non-verbal auditory and visual perception. The partial correlation between the VMI and reading is .39 with the effect of NVADT held fixed and the partial correlation between NVADT and reading is .40 with the effect of VMI partialled out. Thus, the non-verbal auditory and non-verbal visual perceptual variables are separately correlated significantly with reading at the .01 level, and they jointly contribute a statistically significant increase in correlation with reading (Table 2).

The third hypothesis:

> Reading and spelling achievement at the end of the first grade are significantly related to a composite prediction containing both non-verbal auditory and visual perception...

is confirmed in that 37 per cent of the variance between total reading and a composite prediction containing both non-verbal auditory and visual perception with a multiple correlation of .61. The prediction of spelling is similarly upheld with a composite of non-verbal auditory and visual perception accounting for 30 per cent of the variance with an R=.55 (Table 2).

The data do not support the fourth hypothesis:

> Perceptual variables which have verbal components will be better predictors of reading and spelling achievement than the non-verbal visual and auditory perceptual variables.

The non-verbal auditory and visual perceptual variables consistently turn up as better predictors of the criterion variables than do the perceptual variables with verbal components. More than 30 per cent of the variance in reading and spelling is accounted for by non-verbal auditory and visual perceptual variables. Furthermore, the multiple correlations between the VMI and NVADT with reading and spelling are all greater than R=.55 and significant at the .01 level (Table 2).

There is strong support for the first portion of the fifth hypothesis: Middle-class children will be more able than lower-class children on preceptual variables having verbal components...; in that middle-class children performed significantly better on all tests, including perceptual tests without verbal components (Table 3). Therefore, the second portion of the hypothesis; ...no differences will

be obtained between these groups (i.e., socio-economic groups) for the perceptual variables which are free from verbal components, is disconfirmed. In fact, the difference in the mean test performance between middle-class and lower-class ranges from $p = .01$ to $p < .001$ on all but two of the visual perceptual tests, Picture Squares and Reversals which show a difference between means at a level of $p > .10$ and $p > .05$ respectively.

Insert Table 3 about here

It should be noted that the non-verbal auditory test (NVADT) and the non-verbal visual perceptual test (VMI) account for the greatest amount of variance in academic learning in a regression equation in both socio-economic groups. However, the relative importance of each variable is reversed in that auditory discrimination is more important in the middle socio-economic sample, while visual perception is more important in the low socio-economic sample when predicting first grade achievement (Table 2).

DISCUSSION AND CONCLUSIONS

This exploration was intended to be a first step in a series of studies to evaluate visual and auditory (and ultimately tactile-kinesthetic) perceptual development of children through eight years of age, in order eventually to determine the minimum perceptual requisites for acquisition of beginning reading skills, to assess the type of instruction most appropriate for children having particular perceptual patterns, and to develop group screening tests to make such assessment possible.

Table 3

UNIVARIATE STATISTICS

Variable	Sample	Mean	Standard Deviation	Range
SRA, PMA	Total	106.4	10.7	80-135
	Mid SES	111.7***	8.7	82-135
	Lo SES	101.5	11.5	80-128
Picture Squares	Total	13.1	3.4	1-18
	Mid SES	13.4*	3.6	3-18
	Lo SES	12.9	3.3	1-18
Reversals Test	Total	62.4	15.2	15-84
	Mid SES	63.9*	14.0	17-84
	Lo SES	61.0	15.6	15-84
Visual-Motor Integration Test	Total	12.0	1.7	6-17
	Mid SES	12.6***	1.7	8-17
	Lo SES	11.5	1.6	6-17
Wepman Total	Total	25.9	5.5	10-37
	Mid SES	28.1***	5.2	10-37
	Lo SES	24.2	5.2	12-35
Wepman Test	Total	17.9	4.3	0-30
	Mid SES	19.5***	4.4	0-30
	Lo SES	16.8	3.9	0-27
Wepman Validity Scale	Total	7.9	2.3	0-10
	Mid SES	8.6***	1.9	0-10
	Lo SES	7.4	2.5	0-10
Non-Verbal Auditory Discrimination Test	Total	20.9	4.5	6-30
	Mid SES	22.5***	3.9	9-30
	Lo SES	19.7	4.6	6-30
Reading Total	Total	51.4	14.9	13-70
	Mid SES	59.9***	10.3	15-70
	Lo SES	44.6	14.6	13-60
Word Knowledge	Total	25.8	7.8	4-35
	Mid SES	30.1	5.4	6-35
	Lo SES	22.3	7.7	4-35
Word Discrimination	Total	25.5	7.6	5-35
	Mid SES	29.6***	5.7	6-35
	Lo SES	22.3	7.4	4-35
Spelling Test	Total	9.9	5.9	0-20
	Mid SES	14.5***	4.7	0-20
	Lo SES	6.4	4.1	0-18

*** = Difference between SES at < .001 level of significance.
** = Difference between SES at = .01 level of significance.
* = Difference between SES at > .05 level of significance.

Sample Size

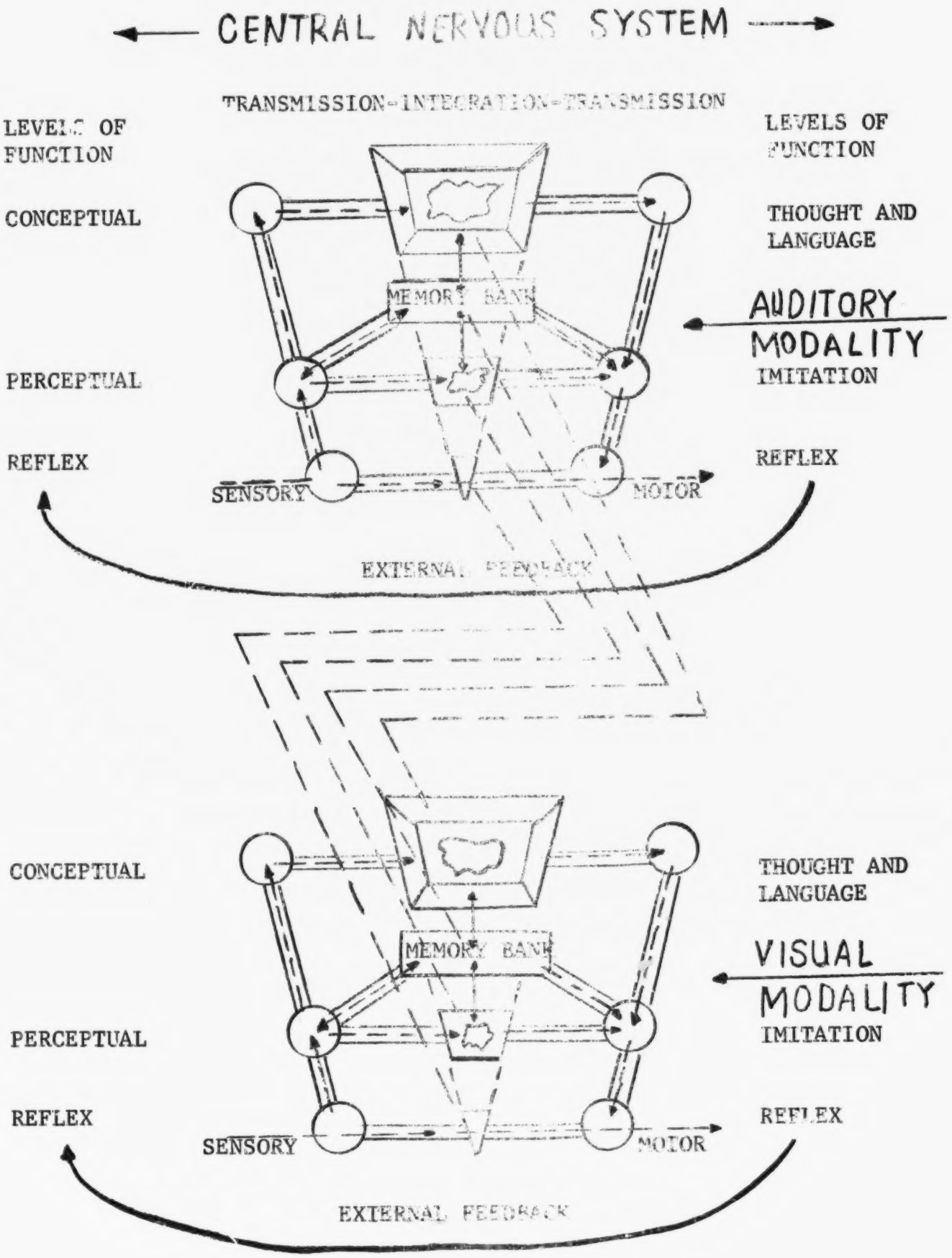
Total	N = 342
Mid SES	N = 145
Lo SES	N = 197

Perhaps the most significant finding is that auditory and visual perception show virtual independence of each other, having only four per cent common variance. Since they seem to be independent functions, it should be particularly important to consider both modalities separately in primary-grade instruction. However, the meaning of the finding can only be conjectured. Independence of auditory and visual perception might indicate separate neurological input, output and integrative systems for both auditory and visual perception, with some articulation at the integrative level. To illustrate, we might first consider Wepman's model (1960) as a point of departure, but his paradigm seems to allow for considerable overlap between the two modalities. Figure 1 illustrates parallel or analogous domains for each modality as suggested by results of this study. The broken lines between the modes represent only four per cent of the two perceptual domains which are common or overlap.

Insert Figure 1 about here

The fact that non-verbal auditory perception and non-verbal visual perception have separate and signficant correlations with reading is another indication of the small amount of overlap between the two modalities.

The crossover of the modalities probably occurs at the integration plane, but to a minimum degree; the greatest amount at the conceptual level; and so on until there is virtually no overlap at the reflex level of functioning. Perhaps overlap at the reflex level occurs only



= Fig. 1. Schematic Representation of Separate Perceptual Modes (Buktenica, 1966)

when the input or output tracts are overloaded. The overload would result in a short circuiting, as it were, in which the impluse would jump from one tract to the other. A gross example of this occurring would be experiencing visual images after exposure to a painful auditory stimulus. Further study will be necessary to determine the operation of the model, as illustrated in Figure 1, but the purpose here is to demonstrate the relative independence of the two modalities, as found in this study.

Second, the determination of how perceptual abilities relate to achievement at the first-grade level, with group-testing devices, seems especially significant for educational planning. It is very important for instructional, curriculum, and diagnostic purposes to be able to diagnose or assess types of learning patterns based on emotional development, intelligence, or perceptual variables at the crucial age of a first-grade child. Economy of time is an important consideration in education, and since the Visual-Motor Integration Test and Non-Verbal Auditory Discrimination Test seem to account for 37 per cent of variance in reading, with such a small investment of time (in comparison to a group-administered intelligence test, taking four times as long to administer, and accounting for less variance), further consideration might be given to a more general use of these or similar screening instruments.

Third, teaching of reading and spelling was not the concern of this study, but the findings suggest that the acquisition of reading

or spelling is, to a significant extent, dependent on certain (not fully determined yet) requisite levels of auditory and visual perceptual development. There should be little quarrel with the contention that perceptual modalities of children at a first-grade level ought to be taken into consideration so that they might begin their education with every advantage, in order to foster favorable attitudes and learning patterns, and thus maximize development of individual potentialities.

A fourth significant finding is that differences of performance occur among various sub-groups of the sample. Middle-class children perform better on I.Q., perceptual and achievement tests. In addition, the mean performance of children who attended kindergarten is significantly better than that of children who had not attended kindergarten on tests of reading, spelling and non-verbal auditory discrimination (.01 to < .001). There are no significant differences between kindergarten and non-kindergarten groups in I.Q., visual perception, or verbal auditory perception. White children preform better than Negro children on all tests; the difference being significant at .01 level to .001 level. And finally, the girls tend to perform better than boys but not at a level of statistical significance.

In conclusion, non-verbal auditory and visual perceptual abilities having significant positive correlation with reading and spelling achievement at the first-grade level can be assessed with group

screening instruments. This finding represents a first step toward gathering more information leading to a solution of the pedagogical problem of matching children according to their individual proclivities with the appropriate mode of instruction.

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